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**Pacifico et al.**

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(54) **SENSITIVE SUBSTANCE ENCAPSULATION**

(75) Inventors: **Carl J. Pacifico**, West Milford, NJ  
 (US); **Wen-Hsin Wu**, Middletown;  
**Marta Fraley**, Parksville, both of NY  
 (US)

(73) Assignee: **Balchem Corporation**, Slate Hill, NY  
 (US)

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(56) **References Cited**

#### U.S. PATENT DOCUMENTS

3,857,964 12/1974 Yolles .  
 4,232,047 \* 11/1980 Sair et al. .... 426/96

4,532,145 7/1985 Saleeb et al. .  
 4,576,737 3/1986 Johnson .  
 4,576,826 3/1986 Liu et al. .  
 4,689,235 \* 8/1987 Barnes et al. .... 426/89  
 4,828,857 5/1989 Sharma et al. .  
 5,004,595 4/1991 Cherukuri et al. .  
 5,009,900 \* 4/1991 Levine et al. .... 426/96  
 5,399,368 3/1995 Garwood et al. .  
 5,460,756 10/1995 Redding, Jr. .  
 5,496,574 3/1996 Rushmore et al. .  
 5,506,353 4/1996 Subramaniam .  
 5,558,889 9/1996 Rossi .  
 5,580,593 12/1996 Liu et al. .  
 5,601,865 2/1997 Fulger et al. .  
 5,603,971 2/1997 Porzio et al. .  
 5,607,708 3/1997 Fraser et al. .  
 5,705,207 1/1998 Cook et al. .  
 5,756,136 5/1998 Black et al. .  
 5,792,505 8/1998 Fulger et al. .  
 5,874,102 2/1999 LaJoie et al. .

\* cited by examiner

Primary Examiner—Samuel A. Acquah

(74) Attorney, Agent, or Firm—Banner & Witcoff, Ltd.

(57) **ABSTRACT**

A process for stabilizing a sensitive substance; (a) plating a sensitive substance onto a solid carrier under a controlled atmosphere to reduce loss of the sensitive substance; (b) encapsulating the plated material under controlled atmosphere and airflow to reduce volatilization during the process and stabilize the sensitive substance.

**20 Claims, No Drawings**